

Chemists zero in on protein
structure-function relationships
Page 23

SEPTEMBER 30, 1991

CHEMICAL & ENGINEERING

NEWS



Drugs for Diabetes

New types of treatment
in clinical trials
Page 35

News of the Week

■ American Home Products plans to acquire biopharmaceuticals maker Genetics Institute in a deal valued at \$666 million. **Page 6**

■ Germany's Bayer will reorganize its U.S. holding company, Bayer USA, as an operating firm, which will be called Miles Inc. **Page 7**

■ St. Louis mother convicted of murdering her baby by ethylene glycol poisoning has been cleared following evidence of lab errors and that cause of death was a rare genetic disease. **Page 7**

■ Soviet Academy of Sciences may break up as a result of the growing autonomy of the Soviet Union's republics, says White House science adviser D. Allan Bromley. **Page 8**

■ New electronic medical journal, described as the first peer-reviewed science journal to be distributed on-line, will be launched by AAAS and Online Computer Library Center Inc. **Page 8**

Cover: Hexamer of insulin. Slide produced by R. E. Hubbard and M. J. Hartshorn of the University of York, England, using the Quanta program from x-ray crystallographic data determined by G. G. Dodson and colleagues at York. Photo courtesy of Polygen Corp./Molecular Simulations

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Business

Air Products' chief Dexter Baker, 1991 SCI medalist, points to need for opening markets worldwide, improving public's image of industry, attracting more students to careers in chemistry. **Page 13**

Government

White House Office of Science & Technology Policy faces a hard look in hearings slated for next month as pressure builds on science adviser Bromley to restructure office's technology policy. **Page 17**

NIH can significantly increase the number of grants it awards as the result of cost controls installed during the past year. **Page 19**

Science/Technology

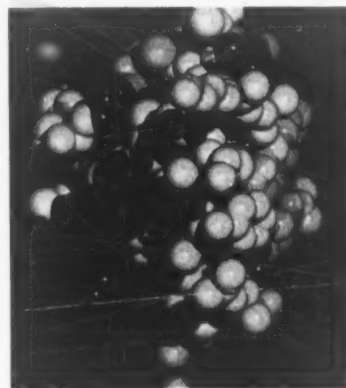
Site-directed mutagenesis has handed chemists a powerful tool for probing protein reactions in biological systems at the molecular level. **Page 23**

Titanium silicate molecular sieves may find applications in fields of adsorption and catalysis. **Page 31**

Approaches to optimizing bioreactor production of antibodies may result from research at Rensselaer Polytechnic Institute. **Page 32**

ACS News

Materials Chemistry Secretariat was formed by 11 divisions at recent ACS national meeting in New York. **Page 33**



Product Report

Human insulin, insulinlike compounds, and other drugs aimed at treating diabetes and its complications are being developed by medicinal chemists and biotechnologists. **Page 35**

Chemical & Engineering News

1155—16th St., N.W., Washington, D.C. 20036

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Published by
AMERICAN CHEMICAL SOCIETY
(202) 872-4600; TDD (202) 872-4432
John Kistler Crum, Executive Director
Robert H. Marks, Director, Publications Division
PUBLISHING BOARD: Jeanne M. Shreeve (Chairman); Board of Directors Chairman: Joseph A. Dixon; President: S. Allen Heininger; Richard L. Deming; William P. Jencks; Gary J. Long; and Louis D. Quin

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Subscription Rates 1991: Printed editions: nonmembers U.S. 1 yr. \$95, 2 yr. \$171, outside U.S. 1 yr. \$131, 2 yr. \$243. Air freight rates available on request. Rates above do not apply to nonmember subscribers in Japan, who must enter subscription orders with Maruzen Co. Ltd., 3-10 Nihonbashi 2-chome, Chuo-ku, Tokyo 103, Japan. Tel: (03) 272-7211. Single copies: Current \$12. Rates for back issues and volumes are available from Microforms & Back Issues Office, ACS, 1155—16th St., N.W., Washington, D.C. 20036. Back and current issues available on microfilm and microfiche. Rates on request from Microform Program, ACS.

Chemical & Engineering News (ISSN 0009-2347) is published weekly except for the last week in December by the American Chemical Society at 1155—16th St., N.W., Washington, D.C. 20036. Second-class postage paid at Washington, D.C., and additional mailing offices. POSTMASTER: Send address changes to Chemical & Engineering News, Membership & Subscription Services, P.O. Box 3337, Columbus, Ohio 43210. ACS assumes no responsibility for the statements and opinions advanced by the contributors to its publications.

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(For list of offices see page 83)

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LETTERS

Supporting the space station

It has come to my attention that there is considerable concern that the money allocated to space station *Freedom* is cutting into other programs. I am understandably concerned that chemistry and chemical engineering programs may be adversely affected.

However, I feel that we should not be stampeded into undermining the space station. It will pioneer many new technologies that will benefit chemistry and many other disciplines in the coming years. It will provide a springboard to the eventual exploitation of the resources of the Moon and beyond, as the shrinking resources of Earth are competed for by all nations. It will employ many fine professionals such as biochemist/astronaut Shannon W. Lucid (C&EN, Aug. 19, page 7). It will help inspire future chemical professionals, in part due to the broad interest enjoyed by the space programs. It should be supported in addition to seeking increased funding for chemistry programs.

Robbing Peter to pay Paul will not solve the budget crunch caused in large part by the \$100 billion-plus savings and loan disaster—only shift the focus. Loss of these research monies in the long run will prove a greater disaster. Eating the seed guarantees a smaller crop. Those who follow us will not thank us any more than the shortsighted individuals to which the vacant steel mills and razed support industries stand as grim testament.

William M. Cress
Freedom, Pa.

Cold fusion

The suggestion by Albert H. Alberts (C&EN, Aug. 12, page 3) that an intrinsic artifact in the isoperibolic calorimetric method may have led many cold fusion research groups astray is simply not valid. The possible error sources reported by Frederick T. Wagner et al. [J. Electroanal. Chem., 295, 393 (1990)] involving the operation of a calibration heater in the cell and the decreasing electrolyte level during electrolysis are carefully considered by most research groups that use isoperibolic calorimetric methods. We did not use an in-cell calibration heater in our

experiments; hence that error source can be quickly dismissed. We reported and corrected for the changing electrolyte level effect in a previous publication [J. Fusion Energy, 9, 333 (1990)]. A modified design has minimized the effect of the electrolyte level in our present calorimetric cells [J. Electroanal. Chem., 296, 241 (1990)]. As pointed out by Wagner et al., isoperibolic calorimetric methods can give accurate results when these error sources are taken into account.

I hope other readers did not miss the major point of our preliminary note on excess heat and concurrent helium production in cold fusion experiments [J. Electroanal. Chem., 304, 271 (1991)]. To my knowledge, helium can be produced from electrochemical cells containing D₂O, LiOD, Pd, and Pt only by fusion processes or elemental transmutations. No calorimetric artifact can explain our helium finding. Regarding the apparent lack of refereeing, I have had previous publications on unrelated subjects accepted by action of the editor. Many scientists, such as Alberts, have now studied our preliminary note or have listened to various presentations regarding this work, yet no significant flaws have been uncovered.

The observation of cold fusion effects in electrochemical cells requires special attention to many details such as cell geometry, electrode arrangements, current density, and control of impurities as well as considerable patience. I am not surprised that many research groups were unsuccessful in their few weeks of frenetic cold fusion research. It took our group over five months of investigating various parameters before any excess heat effects were observed. A new method reported by S. Szpak et al. [J. Electroanal. Chem., 302, 255 (1991)] involving the codeposition of palladium and deuterium from D₂O solutions gives a more reliable and rapid initiation of the Fleischmann-Pons effects. It should be possible for other groups to verify our excess heat

Correction

• Sept. 9, page 41: The product generated by the organolithium reagent should properly have been named 3-methylheptane, not 2-ethylhexane.

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Cost controls help NIH boost grants awarded

Cost controls put in place over the past year are allowing the National Institutes of Health, which funds about 30% of all academic chemistry research, to increase significantly the number of grants it awards. At the National Institute of General Medical Sciences (NIGMS), the source of most NIH chemistry funds, about one third of applicants for new or competing renewal grants were successful this year, compared with about one out of five in fiscal 1990.

That's good news for chemists worried and frustrated over the tight grant situation of the past few years. NIGMS estimates it will fund 860 new and competing renewal grants this fiscal year, as opposed to 623 last year. But while the number of new grants being awarded is increasing, NIH cost-management policies mean that those grants are for less money and for fewer years than most applicants hoped.

NIH's cost-management plan, put in place after much debate last winter, was developed in response to a request from Congress after it was deluged with complaints from researchers about a funding crisis. Congress wanted to know why the healthy increases it had been approving in the NIH budget didn't seem to be enough to go around. It asked NIH to develop a plan that would ensure better stability and cost-effectiveness. Among other things, it specifically instructed NIH to address the increasing average duration of grants and the rapidly escalating cost of the average grant.

In the mid-1980s, NIH decided to increase the length of many of its grant awards to five years. The scientific community had advised that longer term grants would mean the time-consuming chore of preparing grant applications would roll around less often.

An unintended, albeit foreseeable, consequence of the decision was to decrease the funds available for new grants. Whenever a grant is awarded, money must be set aside from future-year budgets to cover the grant's entire term. The longer the average grant, the less uncommitted money is

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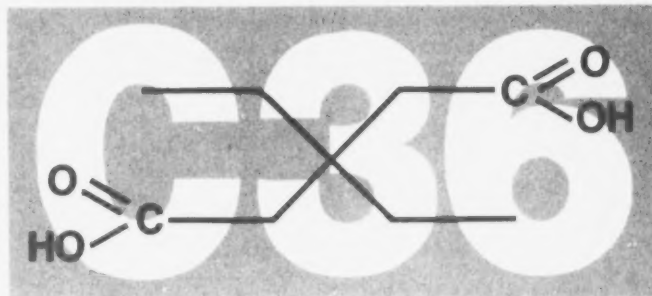


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September 30, 1991 C&EN 19

NIGMS has held cost increases below inflation rate . . .

Average total cost	1991 ^a	1990	% change
Total research project grants	\$183,858	\$175,276	4.9%
New research grant awards	154,355	152,355	1.3
Competing renewal awards	205,345	213,174	-3.7
Noncompeting continuation awards	185,636	172,706	7.5
Biomedical Research & Development Price Index			6.0%

. . . allowing steep rise in new and competing awards

Number of grants awarded	1991 ^a	1990	% change
Total research project grants	3227	3174	1.6%
New grants and competing renewal awards	860	623	38.0

^a Projected. Source: National Institute of General Medical Sciences

available for new proposals or renewals.

At Congress' instruction, NIH now is aiming for an average grant length of four years. According to W. Sue Shafer, NIGMS associate director for program activities, only 6% of the 700 or so regular grants—

R01s, in NIH lingo—NIGMS had awarded by early September were for five years. About two thirds were for four years and the remainder for three. That meant 437 applications for five years of support were funded for only four.

Congress also told NIH to keep

the increase in the cost of the average grant to within the Biomedical Research & Development Price Index (BRDPI). That index is calculated to include special expenses that push inflation for R&D higher than the general inflation rate. The BRDPI for 1991 is 5.99%.

NIGMS is projecting a 4.9% increase in the average cost of its total grant portfolio, which it estimates will number 3227 by the end of fiscal 1991. But that increase is not distributed evenly over the different classes of grants.

For example, the average cost of the noncompeting continuation awards that make up the bulk of the portfolio will rise 7.5% to about \$185,000. A significant portion of that increase, according to Shafer, stems from the replacement of cheaper, older grants that have expired with more expensive ones made last year.

To balance the increase in continuation awards, which is well above the BRDPI, NIGMS held down the costs of new grants and grants being renewed. The average size of new grants in fiscal 1991 increased only 1.3% to about \$154,000 over 1990. And competing renewal awards actually decreased 3.7% in average cost to about \$205,000.

New NIGMS grants awarded in 1991 were funded at about 83% of the full amount recommended by the National Advisory General Medical Sciences Council, the policy-setting group that makes the final decisions on awards after the applications have been peer reviewed. Such cuts have been a common practice throughout NIH for years.

However, again on Congressional orders, NIH is giving up the unpopular practice of "downward negotiations." That is, although the grant budget is trimmed initially, it won't be cut any further in subsequent years of the grant.

According to NIGMS's analysis, without the combined effects of the cost-management strategies, NIGMS would have been able to fund only 400 competing awards in fiscal 1991, about one out of six applications. And the total portfolio would have numbered only about 2767, the lowest total since 1983.

Pamela Zurer

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